Consumer and Corporate Affairs Canada | Consommation et Corporations Canada

(11) (A) No. 1 235 975

(45) ISSUED 880503

(52) CLASS 134-5.2

(51) INT. CL.[4] C11D 3/48

(19) (CA) **CANADIAN PATENT** (12)

(54) Washing Agent Compositions Suitable for Washing Dishes in a Washing Machine

(72) Scotte, Pierre,
France

(73) Granted to Société Chimique Des Charbonnages S.A.
France

(21) APPLICATION No. 458,379

(22) FILED 840706

(30) PRIORITY DATE France (83 11426) 830708

No. OF CLAIMS 4

Canada

DISTRIBUTED BY THE PATENT OFFICE, OTTAWA.
CCA-274 (11-82)

ABSTRACT

458379

In a washing agent composition suitable for washing dishes in a washing machine, and which contains a softening agent chosen from the polyphosphates, an alkalinity-producing agent chosen from sodium salts containing sodium metasilicate, a nonionic surface-active agent and a coated chloroisocyanurate derivative, the chloroisocyanurate derivative is stabilised to prevent significant loss of chlorine and of the surface-active agent through mutual destruction while the composition is in storage. This stabilisation is achieved by coating the chloroisocyanurate derivative with the aid of a polyethylene wax employed in a concentration of ~~0.5~~ 0,3 to 10% by weight relative to the weight of the chloroisocyanurate derivative.

NEW WASHING AGENT COMPOSITIONS SUITABLE FOR WASHING DISHES IN A WASHING MACHINE

The present invention relates to new washing agent compositions suitable for washing dishes in a washing machine, and a process for preparing them.

The washing of dishes in a machine involves both the detergent action of the washing agent and the mechanical action of water. Apart from its detergent action, the washing agent must also have a disinfectant capacity and water-softening properties. The washing agent must therefore possess strong detergence but also its composition must be such that it does not cause the formation of foams which are harmful to the mechanical action of water.

This is why the washing agent compositions consist in a known manner of:

- a softening agent, generally chosen from the class of polyphosphates. Among the polyphosphates used, mention can be made of sodium tripolyphosphate, sodium hexametaphosphate and sodium pyrophosphate, as well as the corresponding potassium polyphosphates;

- an alkalinity-producing agent consisting of a sodium salt containing a sodium metasilicate in its anhydrous form or in its pentahydrate form. In a known manner sodium silicate may be partly replaced by sodium carbonate, sodium sulphate, or sodium hydroxide;

- a non-foaming surface-active agent of the non-ionic type, chosen from the following classes of products: ethoxylated linear alcohols, condensate of ethylene oxide

with propylene oxide, alkoxy amines, polyethoxyethers of fatty alcohols, ethoxylated alkylphenols, or phosphoric esters of fatty alcohols. Preferably, for reasons of effectiveness, biodegradability and cost, a surface-active agent is chosen from the class of ethoxylated linear alcohols; and

- a disinfectant.

It is known to use as disinfectant a solid chlorine-based product which releases active chlorine. This is most frequently a sodium or potassium salt of dichloroisocyanuric acid or trichlorocyanuric acid.

It is possible to use anhydrous sodium dichloroisocyanurate titrating at 63% of active chlorine, a sodium dichloroisocyanurate dihydrate titrating at 56% of active chlorine, anhydrous potassium dichloroisocyanurate titrating at 59% of active chlorine, potassium dichloroisocyanurate monohydrate titrating at 56% of active chlorine, calcium dichloroisocyanurate tetrahydrate titrating at 56% of active chlorine or trichloroisocyanuric acid titrating at 91% of active chlorine.

The active chlorine is defined as being the oxidising capacity due to the positive chlorine. To understand better to what positive chlorine corresponds it should be recalled that chlorine present in the chlorinated derivatives described above is bound to a nitrogen atom and is present therein in the oxidation state + 1, that is to say Cl^+.

During the oxidation-reduction process a Cl^+ ion combines with two electrons to be converted into the

Cl^- (chloride) state. Two equivalents of an oxidising agent are released, which correspond to 71 g of elementary chlorine although the atomic weight is only 35.5. This also means that an atom of Cl^+ has the same oxidising capacity as a molecule of elementary chlorine.

The aim is to employ chlorinated disinfectants of the isochlorocyanurate family having the highest possible content of active chlorine. The most advantageous chlorinated disinfectant would therefore be trichloroisocyanuric acid which titrates at approximately 91% of active chlorine. Unfortunately, the higher the active chlorine content of the isochlorocyanurate derivative, the more reactivity the derivative exhibits towards surface-active agents. Washing agents containing an isochlorocyanurate derivative are therefore unstable in storage because they lose significant quantities both of chlorine and of surface-active agent through mutual destruction. This instability is particularly pronounced in the case of trichloroisocyanuric acid.

A means of stabilising isochlorocyanuric derivatives has now been found, which makes it possible to manufacture washing agent compositions which are stable in storage and suitable for washing dishes in a washing machine, even with trichloroisocyanuric acid.

The present invention relates to a new washing agent composition suitable for washing dishes in a washing machine, containing a softening agent chosen from the polyphosphates, an alkalinity-producing agent chosen from the sodium salts containing sodium metasilicate, a nonionic

surface-active agent and a chloroisocyanurate derivative, in which the chloroisocyanurate derivative is coated with a polyethylene wax used in a concentration of 0.3 to 10% by weight relative to the weight of the acid.

It has been found that polyethylene waxes were compatible with the isochlorocyanurate derivatives. Moreover, when used in relatively small amounts, they make it possible to produce good stabilisation. Furthermore, they are dispersible in aqueous media at a temperature of 50 to 65°C.

The polyethylene waxes consist of polyethylenes with an average molecular weight of approximately 2,500, a low melting point below 70°C, a dropping point of 70 to 80°C and a density of 0.86 to 0.88. They are employed in a concentration of 0.3 to 10% by weight relative to the isochlorocyanurate derivative, preferably in a concentration of 3 to 5% by weight. Above 5% difficulties appear in carrying out the coating and it is necessary to modify the coating conditions.

The use of quantities greater than 10% does not produce an appreciable improvement in the storage stability of the washing agent compositions; the use of quantities below 0.3% results in insignificant stabilisation.

The washing agent compositions which are the subject of the invention are manufactured by first carrying out the coating of the isochlorocyanurate derivative with polyethylene waxes. This coating is carried out in any kind of industrial mixer, such as a drum mixer.

A mixer fitted with a heating device is preferably used. It is also possible to employ a rotary mixer of the concrete-mixer type in which the molten wax is sprayed on the isochlorocyanurate derivative heated to a temperature in the region of 50°C. The temperature of use permits good distribution of the polyethylene waxes, which solidify on cooling. The wax-coated isochlorocyanurate derivative is then mixed in another mixer with the other components of the washing agent.

The quantities of the various components employed for the manufacture of the new washing agent compositions which are the subject of the invention are employed in conventional weight ratios. The softening agent chosen from the polyphosphates is employed in a concentration of 25 to 60% by weight and preferably 40 to 50% by weight relative to the weight of the composition.

The alkalinity-producing agent chosen from the sodium silicates is employed in a concentration of 30 to 70% by weight and preferably 40 to 60% by weight relative to the weight of the composition. In a known manner, sodium silicate may be partly replaced with sodium carbonate, sodium sulphate or sodium hydroxide. The nonionic surface-active agent is employed in a concentration of 0.5 to 4% by weight and preferably in a concentration of 1 to 3% by weight relative to the weight of the composition. The isochlorocyanurate derivative coated with the aid of polyethylene waxes is employed in a concentration of 0.5 to 5% by weight and preferably 1 to 3% by weight relative to the weight of the composition.

The following examples illustrate the present invention.

EXAMPLE 1

Trichloroisocyanuric acid is first stabilised with the aid of polyethylene waxes in the following manner:

The acid is heated to a temperature of 50°C and is then placed in a rotary mixer. While the mixer rotates, polyethylene waxes are sprayed from above by means of a spray-gun. The temperature of use permits a good distribution of the waxes, which solidify on cooling. The polyethylene waxes employed have a melting point below 70°C, a dropping point from 70 to 80°C and a density of 0.86 to 0.88. Various mixtures of acid and waxes are produced by using varying percentages of polyethylene waxes. The mixtures obtained in this way are employed for the manufacture of washing agent compositions.

Washing agents having the following composition are prepared (parts are expressed in parts by weight):

- sodium tripolyphosphate: 50 parts,
- sodium metasilicate (anhydrous or $5H_2O$ hydrate): 50 parts,
- PLURAFAC* RA 43 (ethoxylated nonionic surface-active agent manufactured by the company PCUK): 2 parts,
- trichloroisocyanuric acid coated with polyethylene waxes: 2 parts.

A premix of sodium tripolyphosphate with nonionic surface-active agent is first made in a mixer of a rotary type. A homogeneous mixture is obtained after 20 minutes. The metasilicate is then added to the mixer and after 20 min-

* Trade Mark

utes the coated trichloroisocyanuric acid is added. The whole composition is then left in the rotating mixer for 20 minutes. The percentage of chlorine determined by iodometry in the washing agent composition is then 1.65%.

The washing agent composition prepared in this way is placed in plastic bags closed with a non-hermetic closure. The bags are stored in a controlled environment oven under the following conditions:

- temperature: 42°C,
- relative humidity: 85%.

Samples are withdrawn after a storage period of between 2 and 3 months and the residual chlorine is determined by iodometry.

Table 1 shows the results obtained after 80 days' storage for washing agent compositions prepared either from anhydrous sodium metasilicate or from sodium metasilicate pentahydrate and from trichloroisocyanuric acid coated with the aid of polyethylene waxes employed in various percentages (by weight). The results relating to the remaining chlorine are expressed as percentages relative to the original chlorine.

TABLE 1

TRICHLOROISOCYANURIC ACID	Washing agent composition containing anhydrous sodium metasilicate % of remaining chlorine	Washing agent composition containing sodium metasilicate pentahydrate % of remaining chlorine
Not coated with polyethylene waxes	10	10
Coated with 0.3% of polyethylene waxes	23	22
Coated with 0.6% of polyethylene waxes	25	22.5
Coated with 1.4% of polyethylene waxes	56	24

EXAMPLE 2

Example 1 is repeated using trichloroisocyanuric acid coated with various quantities of polyethylene waxes and the determination of remaining chlorine is carried out after 70 days' storage. Table 2 collates the results obtained.

TABLE 2

Trichloroisocyanuric acid	Washing agent composition containing anhydrous sodium metasilicate % of remaining chlorine	Washing agent composition containing sodium metasilicate pentahydrate % of remaining chlorine
Not coated with polyethylene waxes	40	20
Coated with 2% of polyethylene waxes	54	37
Coated with 3% of polyethylene waxes	60	37.5
Coated with 5% of polyethylene waxes	75	39

EXAMPLE 3

Anhydrous sodium isochlorocyanurate (DCCA Na) and sodium isochlorocyanurate dihydrate ($DCCNa.2H_2O$) were prepared under the same conditions as those given in Example 1 for trichlorocyanuric acid. The coating was carried out with the aid of 5% of polyethylene wax.

The washing agent was prepared as in Example 1 but with sodium metasilicate pentahydrate.

Samples were withdrawn after various storage periods.

Figure 1 shows the percentage of chlorine remaining as a function of the storage period in the case of DCCNa.$2H_2O$, and Figure 2 the percentage of remaining chlorine in the case of anhydrous DCC Na.

THE EMBODIMENTS OF THE INVENTION IN WHICH AN EXCLUSIVE PROPERTY OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS:

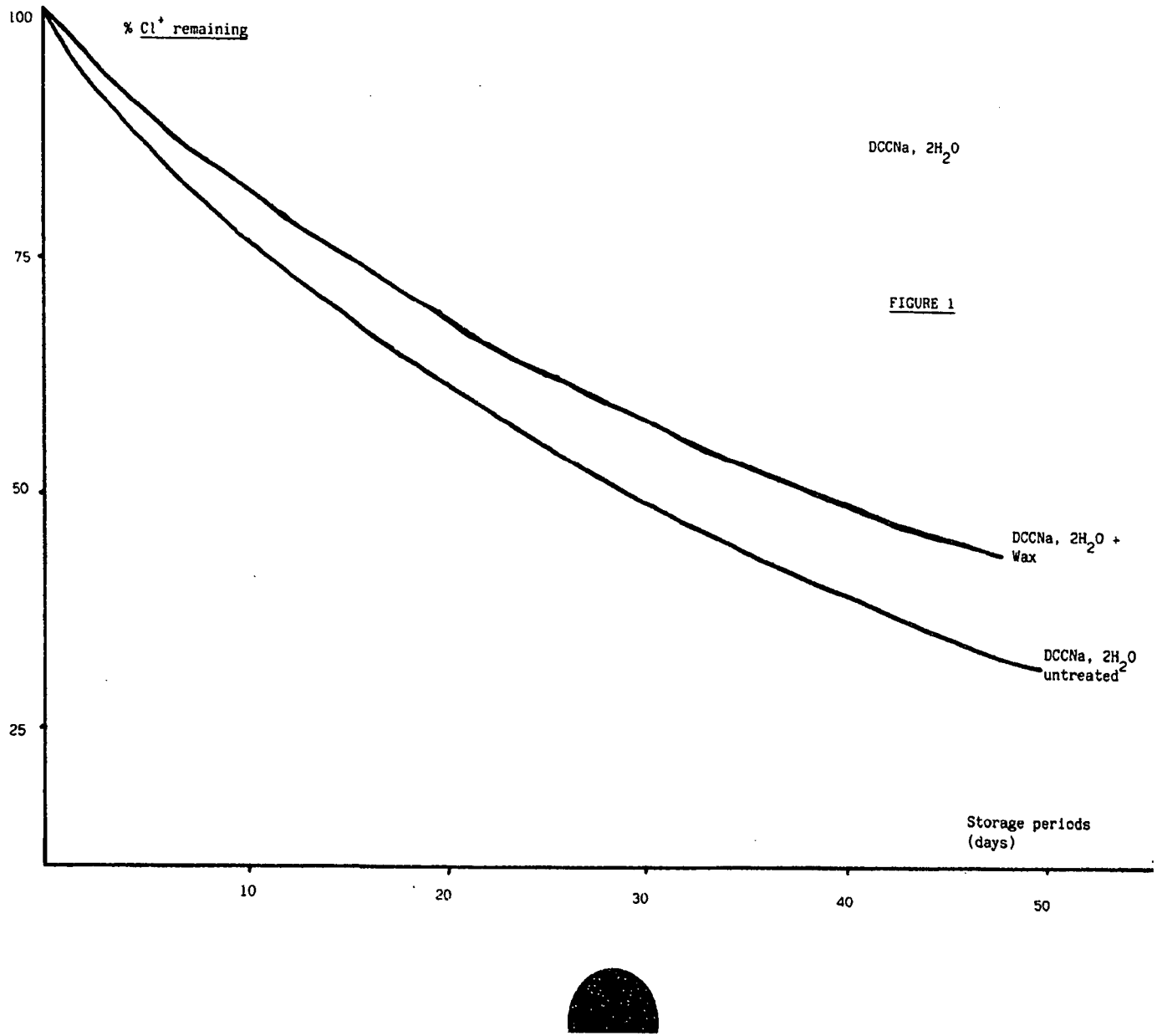
1. New washing agent composition suitable for washing dishes in a washing machine, containing a softening agent chosen from the polyphosphates, an alkalinity-producing agent chosen from sodium salts containing sodium metasilicate, a nonionic surface-active agent and a coated chloroisocyanurate derivative, in which the chloroisocyanurate derivative is coated with a polyethylene wax employed in a concentration of 0.3 to 10% by weight relative to the weight of the chloroisocyanurate derivative.

2. New composition according to Claim 1, in which the chloroisocyanurate derivative is coated with a polyethylene wax in a concentration of 3 to 5% by weight.

3. Process for preparing new washing agent compositions suitable for washing dishes in a washing machine, in which the chloroisocyanurate derivative is first coated with polyethylene wax used in a concentration of 0.3 to 10% by weight relative to the weight of the chloroisocyanurate derivative, and that the chloroisocyanurate derivative is then mixed with the other components of the washing agent.

4. Process for the preparation of new washing agent compositions according to Claim 3, in which the molten wax is sprayed on the isochlorocyanurate derivative heated at 50°C.

//



1235975

2-2

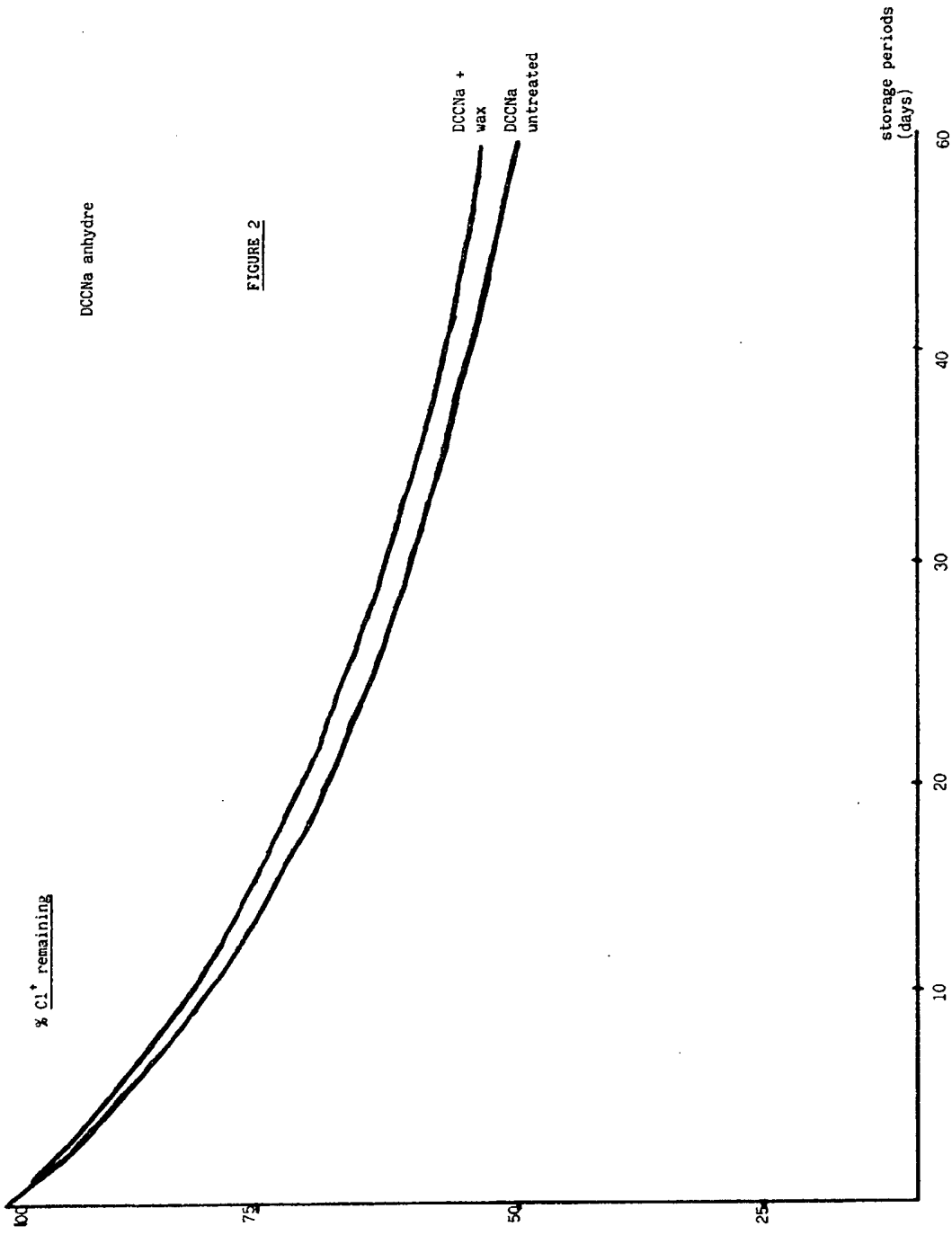


FIGURE 2

Ridout & Maybee
PATENT AGENTS